

MONTHLY WEATHER REVIEW
CONTENTS, VOLUME 97

NUMBER 1

		JANUARY 1969
Experimental Extended Predictions With a Nine-Level Hemispheric Model	K. Miyakoda, J. Smagorinsky, R. F. Strickler, and G. D. Hembree	1-76
Correction Notice		76
A Simple Method of Including Longwave Radiation in a Tropospheric Numerical Prediction Model	Maurice B. Danard	77-85
Notice of Change in "Picture of the Month" Series		85
Picture of the Month—Frontal Wave Development and Tropical Storm Abby	Frances C. Parmenter	86-87
The Weather and Circulation of October 1968—Progression of Large-Amplitude Features at Midlatitudes With Rapidly Varying Temperatures	A. James Wagner	88-94

NUMBER 2

		FEBRUARY 1969
Utilization of Hail-Day Data in Designing and Evaluating Hail Suppression Projects	Stanley A. Changnon, Jr., and Paul T. Schickedanz	95-102
Analysis and Regionalization of the Diurnal Distribution of Tornadoes in the United States	Richard H. Skaggs	103-115
Heavy-Fog Regions in the Conterminous United States	Robert L. Peace, Jr.	116-123
Correction Notice		123
Vortical Cloud Systems Over the Tropical Atlantic During the 1967 Hurricane Season	Neil L. Frank and H. M. Johnson	124-129
The "Inverted V" Cloud Pattern—An Easterly Wave?	Neil L. Frank	130-140
Selected Publications by ESSA Authors		141
On the Interannual Variability of the Tropospheric Energy Cycle and the Quasi-Biennial Oscillation	Alvin J. Miller	142-149
A Truncation Error Reducing Scheme for Balanced Forecast Models	Arne Sundström	150-154
Picture of the Month—"Sunglint"	Frances C. Parmenter	155-156
The Weather and Circulation of November 1968—Continued Blocking Over Eastern North America	L. P. Stark	157-162

NUMBER 3

		MARCH 1969
Atmospheric Teleconnections From the Equatorial Pacific	J. Bjerknes	163-172
Seasonal Interactions Between the North Pacific Ocean and the Atmosphere During the 1960's	Jerome Namias	173-192
A Case Study of the Winter Circulation at 700 and 500 Mb in Middle and High Southern Latitudes	N. A. Streten	193-199
Mean and Eddy Motions in the Atmosphere	Elmar R. Reiter	200-204
Picture of the Month—Clearing of Winter Fog in the Central Valley of California	Ralph K. Anderson	205-206
The Eastern Pacific Hurricane Season of 1968	William J. Denney	207-224
The Atlantic Hurricane Season of 1968	Arnold L. Sugg and Paul J. Hebert	225-239
Atlantic Tropical Disturbances of 1968	R. H. Simpson, Neil Frank, David Shideler, and H. M. Johnson	240-255
Synoptic Histories of Three African Disturbances That Developed Into Atlantic Hurricanes	Toby N. Carlson	256-276
Selected Publications by ESSA Authors		277
Correspondence		
Comments on "Fields of Correlation Assembly—A Numerical Analysis Technique"	C. Eugene Buell	278-279
Reply	Maurice B. Danard, Manfred M. Holl, and James R. Clark	279
Technical Note		
Climatic Probability for Favorable Viewing Conditions Along Path of March 7, 1970, Eclipse	H. C. S. Thom	280
The Weather and Circulation of December 1968—Strong Blocking Over the Western Hemisphere and Cold in the United States	Raymond A. Green	281-286

NUMBER 4

		APRIL 1969
Experiments With a Stratospheric General Circulation Model:		
III. Large-Scale Diffusion of Ozone Including Photochemistry	B. G. Hunt	287-306
Feasibility of Determining Atmospheric Ozone From Outgoing Infrared Energy	C. Prabhakara	307-314
Great Lakes Ice Season of 1968	C. R. Snider and G. D. Linklater	315-332
Correction Notice		332
Note on Low-Level Airborne Observations of Temperature Near Prairie Oases	R. M. Holmes	333-339
Stability Theorems for the Barotropic Vorticity Equation	Arne Sundström	340-345
On the Causes of the Small Number of Atlantic Hurricanes in 1968	Jerome Namias	346-348
Picture of the Month—A Rapidly Developing Storm	Frances C. Parmenter	349-350
The Weather and Circulation of January 1969—Continued Strong High-Latitude Blocking and Flood-Producing Rains in California	A. James Wagner	351-358

NUMBER 5

		MAY 1969
A Simplified Method of Computing Stratospheric Heating Rates and Associated Generation of Available Potential Energy	Gaston Paulin	359-370
The Contribution of Infrared Cooling to the Vertical Motion Field and Its Implication in Atmospheric Energetics	Ben R. Bullock, Lyle H. Horn, and Donald R. Johnson	371-381
Estimating Hurricane Wind Speeds From Satellite Pictures	Lester F. Hubert and Andrew Timchak	382-383
A Survey of Finite-Difference Schemes for the Primitive Equations for a Barotropic Fluid	Arne Grammeltvedt	384-404
Picture of the Month—Observation of Icebergs From Satellites	Alberto Porras	405

MONTHLY WEATHER REVIEW
CONTENTS, VOLUME 97

NUMBER 1

		JANUARY 1969
Experimental Extended Predictions With a Nine-Level Hemispheric Model	K. Miyakoda, J. Smagorinsky, R. F. Strickler, and G. D. Hembree	1-76
Correction Notice		76
A Simple Method of Including Longwave Radiation in a Tropospheric Numerical Prediction Model	Maurice B. Danard	77-85
Notice of Change in "Picture of the Month" Series		85
Picture of the Month—Frontal Wave Development and Tropical Storm Abby	Frances C. Parmenter	86-87
The Weather and Circulation of October 1968—Progression of Large-Amplitude Features at Midlatitudes With Rapidly Varying Temperatures	A. James Wagner	88-94

NUMBER 2

		FEBRUARY 1969
Utilization of Hail-Day Data in Designing and Evaluating Hail Suppression Projects	Stanley A. Changnon, Jr., and Paul T. Schickedanz	95-102
Analysis and Regionalization of the Diurnal Distribution of Tornadoes in the United States	Richard H. Skaggs	103-115
Heavy-Fog Regions in the Conterminous United States	Robert L. Peace, Jr.	116-123
Correction Notice		123
Vortical Cloud Systems Over the Tropical Atlantic During the 1967 Hurricane Season	Neil L. Frank and H. M. Johnson	124-129
The "Inverted V" Cloud Pattern—An Easterly Wave?	Neil L. Frank	130-140
Selected Publications by ESSA Authors		141
On the Interannual Variability of the Tropospheric Energy Cycle and the Quasi-Biennial Oscillation	Alvin J. Miller	142-149
A Truncation Error Reducing Scheme for Balanced Forecast Models	Arne Sundström	150-154
Picture of the Month—"Sunglint"	Frances C. Parmenter	155-156
The Weather and Circulation of November 1968—Continued Blocking Over Eastern North America	L. P. Stark	157-162

NUMBER 3

		MARCH 1969
Atmospheric Teleconnections From the Equatorial Pacific	J. Bjerknes	163-172
Seasonal Interactions Between the North Pacific Ocean and the Atmosphere During the 1960's	Jerome Namias	173-192
A Case Study of the Winter Circulation at 700 and 500 Mb in Middle and High Southern Latitudes	N. A. Streten	193-199
Mean and Eddy Motions in the Atmosphere	Elmar R. Reiter	200-204
Picture of the Month—Clearing of Winter Fog in the Central Valley of California	Ralph K. Anderson	205-206
The Eastern Pacific Hurricane Season of 1968	William J. Denney	207-224
The Atlantic Hurricane Season of 1968	Arnold L. Sugg and Paul J. Hebert	225-239
Atlantic Tropical Disturbances of 1968	R. H. Simpson, Neil Frank, David Shideler, and H. M. Johnson	240-255
Synoptic Histories of Three African Disturbances That Developed Into Atlantic Hurricanes	Toby N. Carlson	256-276
Selected Publications by ESSA Authors		277
Correspondence		
Comments on "Fields of Correlation Assembly—A Numerical Analysis Technique"	C. Eugene Buell	278-279
Reply	Maurice B. Danard, Manfred M. Holl, and James R. Clark	279
Technical Note		
Climatic Probability for Favorable Viewing Conditions Along Path of March 7, 1970, Eclipse	H. C. S. Thom	280
The Weather and Circulation of December 1968—Strong Blocking Over the Western Hemisphere and Cold in the United States	Raymond A. Green	281-286

NUMBER 4

		APRIL 1969
Experiments With a Stratospheric General Circulation Model:		
III. Large-Scale Diffusion of Ozone Including Photochemistry	B. G. Hunt	287-306
Feasibility of Determining Atmospheric Ozone From Outgoing Infrared Energy	C. Prabhakara	307-314
Great Lakes Ice Season of 1968	C. R. Snider and G. D. Linklater	315-332
Correction Notice		332
Note on Low-Level Airborne Observations of Temperature Near Prairie Oases	R. M. Holmes	333-339
Stability Theorems for the Barotropic Vorticity Equation	Arne Sundström	340-345
On the Causes of the Small Number of Atlantic Hurricanes in 1968	Jerome Namias	346-348
Picture of the Month—A Rapidly Developing Storm	Frances C. Parmenter	349-350
The Weather and Circulation of January 1969—Continued Strong High-Latitude Blocking and Flood-Producing Rains in California	A. James Wagner	351-358

NUMBER 5

		MAY 1969
A Simplified Method of Computing Stratospheric Heating Rates and Associated Generation of Available Potential Energy	Gaston Paulin	359-370
The Contribution of Infrared Cooling to the Vertical Motion Field and Its Implication in Atmospheric Energetics	Ben R. Bullock, Lyle H. Horn, and Donald R. Johnson	371-381
Estimating Hurricane Wind Speeds From Satellite Pictures	Lester F. Hubert and Andrew Timchak	382-383
A Survey of Finite-Difference Schemes for the Primitive Equations for a Barotropic Fluid	Arne Grammeltvedt	384-404
Picture of the Month—Observation of Icebergs From Satellites	Alberto Porras	405

NUMBER 5 (Continued)

Correspondence

Comments on "The Weather and Circulation of February 1968—Cold and Dry in the East, Warm in the West"	May 1969
Reply-----	Livingston Lansing 406
The Weather and Circulation of February 1969—Strong Blocking Over North America for the Sixth Consecutive Month	Julian W. Posey 406
	L. P. Stark 407-414

NUMBER 6**JUNE 1969**

A Climatology of Epsilon (Atmospheric Dissipation)-----	Hugh W. Ellsaesser 415-423
Wind Variability as a Function of Time-----	Hugh W. Ellsaesser 424-428
Effect of Range on Apparent Height and Frequency of High-Altitude Radar Precipitation Echoes-----	
A. J. Kantor and D. D. Grantham	429-431
Interaction Between Subtropical and Polar-Front Jet Stream-----	E. R. Reiter and L. F. Whitney 432-438
A Finite-Difference Approximation of the Primitive Equations for a Hexagonal Grid on a Plane-----	Robert Sadourny and Pierre Morel 439-445
Diurnal Wind Variations, Surface to 30 Kilometers-----	J. M. Wallace and F. R. Hartranft 446-455
A Comparison of Observed and Theoretical Diurnal Tidal Motions Between 30 and 60 Kilometers-----	Richard J. Reed, Michael J. Oard, and Marya Sieminski 456-459
Correspondence-----	
Time Extrapolation in a Combination Jury-Marching Problem Saves Computer Time-----	Lansing J. Sloan and Harold D. Orville 460
Reply-----	James H. S. Bradley 460-461
Picture of the Month—Hooked Echo Associated With Snow Showers-----	A. D. Lentini and R. G. Pappas 462-463
The Weather and Circulation of March 1969—A Very Cold Month With a Developing Flood Threat in the Upper Midwest-----	Julian W. Posey 464-470

NUMBER 7**JULY 1969**

Models of Precipitating Cumulus Towers-----	Joanne Simpson and Victor Wiggert 471-489
Satellite Studies of Clouds and Cloud Bands Near the Low-Level Jet-----	William D. Bonner and Frank Winninghoff 490-500
Suggestions for Authors-----	501
Role of Differential Friction and Asymmetry of the Total Flow on Hurricane Movement-----	Gandikota V. Rao 502-509
Picture of the Month—An Upper Tropospheric System-----	Frances C. Parmenter 510-511
Heat Balance Studies During an Ice-Fog Period in Fairbanks, Alaska-----	Gerd Wendler 512-520
Correspondence-----	
Comments on "The Eastern Pacific Hurricane Season of 1968"-----	L. F. Hubert 521-522
Reply-----	W. J. Denney 522
The Weather and Circulation of April 1969—A Warm Month Accompanied by Severe Flooding in the Upper Midwest and Increased Westerlies-----	James F. Andrews 523-526

NUMBER 8**AUGUST 1969**

Analyzing and Forecasting Clear-Air Turbulence Probabilities Over the United States-----	R. L. Mancuso and R. M. Endlich 527-533
Heat Balance and Mean Meridional Circulations in the Polar Stratosphere During the Sudden Warming of January 1958-----	J. D. Mahlman 534-540
Notice to Contributors-----	540
The Warming of the Upper Stratosphere in February 1966 and the Associated Structure of the Mesosphere-----	Roderick S. Quiroz 541-552
A Preliminary Study of the Stratospheric Warming of December 1967–January 1968-----	Keith W. Johnson 553-564
Proposed Indices Characterizing Stratospheric Circulation and Temperature Fields-----	Keith W. Johnson, Alvin J. Miller, and Melvyn E. Gelman 565-570
Selected Publications by ESSA Authors-----	571-572
Further Study on the Kinetic Energy Balance-----	Ernest C. Kung 573-581
Nocturnal Urban Boundary Layer Over Cincinnati, Ohio-----	John F. Clarke 582-589
A Proposed Mechanism for Cumulonimbus Persistence in the Presence of Strong Vertical Shear-----	Ronnie L. Alberty 590-596
A Note on Global Forecasting With the Kurihara Grid-----	Clifford H. Dey 597-601
A Note on Drawing Probability Sectors-----	Peter P. Chase 602-603
Effect of Housing Shape on the Catch of Recording Gages-----	Douglas M. A. Jones 604-606
A Statistical Comparison of Winter-Summer Rocketsonde-Radiosonde Temperatures in the 20- to 34-Kilometer Region of the Stratosphere-----	Francis J. Schmidlin 607-612
Correspondence-----	
Comments on "Biennial Variation in Springtime Temperature and Total Ozone in Extratropical Latitudes"-----	E. Farkas 613-615
Reply-----	J. K. Angell and J. Korshover 615
Picture of the Month—Cirrus Cloud Trail-----	Frances C. Parmenter 616-617
The Weather and Circulation of May 1969—A Mild Month With an Increase of Blocking at High Latitudes-----	Raymond A. Green 618-622

NUMBER 9**SEPTEMBER 1969**

On the Kinetic Energy Near the Ground-----	Abraham H. Oort and Albion Taylor 623-636
Correction Notice-----	636
Radiation Models of Midlatitude Synoptic Features-----	Stephen K. Cox 637-651
A Technique of Objective Analysis and Initialization for the Primitive Forecast Equations-----	Takashi Nitta and John B. Hovermale 652-658
Tests of the Effect of Grid Resolution in a Global Prediction Model-----	M. Sankar Rao and Ludwig Umscheid, Jr. 659-664
Development of a Limited Area Fine-Mesh Prediction Model-----	Joseph P. Gerrity, Jr., and Ronald D. McPherson 665-669

NUMBER 9 (Continued)

	SEPTEMBER 1969
Systematic Errors in Operational Baroclinic Prognoses at the National Meteorological Center	E. B. Fawcett 670-682
Picture of the Month—Alaskan Forest Fires	Frances C. Parmenter 683
The Weather and Circulation of June 1969—A Predominantly Cool and Wet Month	A. James Wagner 684-690

NUMBER 10

OCTOBER 1969

Evapotranspiration Climatology:	
I. A New Approach to Numerical Prediction of Monthly Evapotranspiration, Runoff, and Soil Moisture Storage	H. Lettau 691-699
Long-Term Variations in Equatorial Circulation and Rainfall	A. F. Krueger and T. I. Gray, Jr. 700-711
On the Question of Measuring the Vertical Temperature Distribution of the Atmosphere From Satellites	Sigmund Fritz 712-715
Correction Notice	715
Some Remarks on African Disturbances and Their Progress Over the Tropical Atlantic	Toby N. Carlson 716-726
Weather Note:	
A Mesoscale Cold Front in New England	Frederick Sanders 727-729
Picture of the Month—Early Summer Tornado Situation	Frances C. Parmenter 730-731
Correspondence:	
A Reliable Method for the Numerical Integration of a Large Class of Ordinary and Partial Differential Equations	R. S. Lindzen and H.-L. Kuo 732-734
The Weather and Circulation of July 1969—A Predominantly Wet Month, Cool in the North and Warm in the South	James F. Andrews 735-738
New ESSA Publication	738

NUMBER 11

NOVEMBER 1969

Climate and the Ocean Circulation:	
I. The Atmospheric Circulation and the Hydrology of the Earth's Surface	Syukuro Manabe 739-774
II. The Atmospheric Circulation and the Effect of Heat Transfer by Ocean Currents	Syukuro Manabe 775-805
III. The Ocean Model	Kirk Bryan 806-827
Picture of the Month—Hurricane Camille	Frances C. Parmenter 828-829
The Weather and Circulation of August 1969—A Month With Record Warmth in the West	Robert R. Dickson 830-834

NUMBER 12

DECEMBER 1969

Numerical Studies of Effects of Surface Friction on Large-Scale Atmospheric Motions	Maurice B. Danard 835-844
Effect of a Sudden Change in Terrain Height on the Three-Dimensional Low-Level Air Flow, as Estimated From Tetroon Flights	W. H. Hoecker and J. K. Angell 845-849
Flow Over a Localized Heat Source	M. A. Estoque and C. M. Bhumralkar 850-859
Surface Heat Budget of the Pampa de La Joya, Peru	Charles R. Stearns 860-866
Quasi-Biennial Variations in the "Centers of Action"	J. K. Angell, J. Korshover, and G. F. Cotten 867-872
Picture of the Month—Convective Clouds Along the Jet Stream	Frances C. Parmenter 873-874
On Anomalous Dark Patches in Satellite-Viewed Sunlight Areas	E. Paul McClain and Alan E. Strong 875-884
Numerical Integration of Fluid Flow Over Triangular Grids	David Williamson 885-895
Note on the Accumulated Error in the Numerical Integration of a Simple Forecast Model	Walter James Koss 896-901
Note on Estimation of Vertical Motion by the Omega Equation	Dušan Djurić 902-904
Satellite Evidence of Sea-Air Interactions During the Indian Monsoon	K. Raghavan 905-908
Selected Publications by ESSA Authors	909
The Weather and Circulation of September 1969—Persistence of the August Regime in the United States	Julian W. Posey 910-915
Contents, Volume 97	916-918
Correction Notices	918
Index, Volume 97	919-925

CORRECTION NOTICES

Vol. 96, No. 1, Jan. 1968: p. 26, 2d paragraph, 3d line from bottom, F is to be read instead of E, and G instead of F; p. 28, 3d line after equation (4), \bar{u}_s instead of u_s , and 10th line after equation (4), release instead of reseal; p. 30, fig. 11 caption, $[\bar{u}][\bar{v}]$ instead of $[u][v]$.
 Vol. 96, No. 5, May 1968: pp. 271-272, equations (18), (19), and (20) should read

$$U_* = \frac{kU(\Delta z + h\lambda)}{\frac{\Delta z}{h+z_0} \cdot \phi_M \left(\frac{h}{L} \right) + \int_0^h \frac{\phi_M(z)}{z+z_0} dz} dz \quad (18), \quad \theta_* = \frac{k[\theta(\Delta z + h) - \theta_0]}{\frac{\Delta z}{h+z_0} \cdot \phi_H \left(\frac{h}{L} \right) + \int_0^h \frac{\phi_H(z)}{z+z_0} dz} dz \quad (19), \quad \text{and} \quad q_* = \frac{k[q(\Delta z + h) - q_0]}{\frac{\Delta z}{h+z_0} \cdot \phi_q \left(\frac{h}{L} \right) + \int_0^h \frac{\phi_q(z)}{z+z_0} dz} dz \quad (20);$$

also p. 272, add the following paragraph just above "GROUND TEMPERATURE": The values of K_M , K_H , and K_q obtained from the formulation of Estoque [3] when $0 \geq R_i \geq 0.2$ and the formulations explained above in respect of the other ranges of R_i are assigned to the level $z=h$. A linear fall of this value to $\frac{1}{10}$ th at $H=2050$ m is assumed.

Vol. 96, No. 10, Oct. 1968: p. 736, caption of figure 1(a) and 1(b), "absorption" should be replaced by "slab absorptivity" and add "The absorptivity of a slab is computed from the absorptivity of a column by using the following formula, $a_s(u) = a_s(1.66u)$, where a_s and a_s are the absorptivities of slab and column, respectively, and u is optical thickness at STP," ordinate (a_s), abscissa ($\log u$); p. 739, legend of figure 8, symbols for plotting (M-S) and (R-W)₂ should be interchanged.

Vol. 97, No. 1, Jan. 1969: p. 84, 4th line after equation (20) should read "initial state, equation (19) is thus . . .".

Vol. 97, No. 3, Mar. 1969: p. 286, next to the last sentence, "Moscow Airport in Idaho reported -50°F, on the 30th, the coldest December temperature of record in the State." is incorrect and should be deleted.

INDEX, VOLUME 97

A

- ALBERTY, RONNIE L.:**
Proposed mechanisms for cumulonimbus persistence in presence of strong vertical shear. 590.
- Analysis and regionalization of diurnal distribution of tornadoes in U.S. 103.**
- Analyzing and forecasting clear-air turbulence probabilities over U.S. 527.**
- ANDERSON, RALPH K.:**
Picture of month. 205.
- ANDREWS, JAMES F.:**
Weather and circulation of Apr. 1969—warm month accompanied by severe flooding in upper Midwest and increased westerlies. 523.
- Weather and circulation of July 1969—predominantly wet month, cool in North and warm in South. 735.
- ANGELL, J. K.:**
and W. H. Hoecker. Effect of sudden change in terrain height on three-dimensional low-level air flow, as estimated from tetroon flights. 845.
- and J. Korshover. Correspondence—Reply (to comments on "Biennial variation in springtime temperature and total ozone in extra-tropical latitudes"). 615.
- and J. Korshover and G. F. Cotten. Quasi-biennial variations in "centers of action." 867.
- Anomalous dark patches in satellite-viewed sunglint areas. 875.
- Antarctic icebergs from satellites. 405.
- Arctic upper air temperature. 565.
- Atlantic hurricane season of 1968. 225.
- Atlantic tropical disturbances of 1968. 240.
- Atmospheric circulation and effect of heat transfer by ocean currents. 775.
- Atmospheric circulation and hydrology of earth's surface. 739.
- Atmospheric energetics, infrared cooling, and vertical motion field. 371.
- Atmospheric mean and eddy motions. 200.
- Atmospheric motions and frictional effects. 835.
- Atmospheric ozone and infrared energy. 307.
- Atmospheric teleconnections from equatorial Pacific. 163.

B

- Barotropic fluid and finite-difference schemes for primitive equations. 384.
- Barotropic vorticity equation and stability theorems. 340.
- BHUMRALKAR, C. M.:**
and M. A. Estoque. Flow over localized heat source. 850.
- BJERKNES, B.:**
Atmospheric teleconnections from equatorial Pacific. 163.
- Blocking at high latitudes during May 1969. 618.
- Blocking over eastern North America. 116.
- BONNER, WILLIAM D.:**
and F. Winninghoff. Satellite studies of clouds and cloud bands near low-level jet. 490.
- BRADLEY, JAMES H. S.:**
Reply (to "Time extrapolation in combination jury-marching problem saves computer time"). 460.
- BRYAN, KIRK:**
Climate and ocean circulation: III. Ocean model. 806.
- BUELL, C. EUGENE:**
Correspondence—Comments on "Fields of correlation assembly—numerical analysis technique." 278.
- BULLOCK, BEN R.:**
and L. H. Horn and D. R. Johnson. Contribution of infrared cooling to vertical motion field and its implication in atmospheric energetics. 371.

C

- Canadian temperature near prairie oases. 333.
- CARLSON, TOBY N.:**
Some remarks on African disturbances and their progress over tropical Atlantic. 716.
- Synoptic histories of three African disturbances that developed into Atlantic hurricanes. 256.
- Case study of winter circulation at 700 and 500 mb in middle and high southern latitudes. 193.
- Causes of small number of Atlantic hurricanes in 1968. 346.
- CHANGNON, STANLEY A., JR.:**
and P. T. Schicketanz. Utilization of daily data in designing and evaluating hail suppression projects. 95.
- CHASE, PETER P.:**
Note on drawing probability sectors. 602.
- Cincinnati, Ohio, planetary boundary layer. 582.
- CLARK, JAMES R.:**
and M. B. Danard and M. M. Holl. Correspondence—Reply (to comments on "Fields of correlation assembly—numerical analysis technique"). 279.
- CLARKE, JOHN F.:**
Nocturnal urban boundary layer over Cincinnati, Ohio. 582.
- Clear air turbulence over U.S. 527.
- Climate and ocean circulation:
atmospheric circulation and effect of heat transfer by ocean currents. 775.
atmospheric circulation and hydrology of earth's surface. 739.
ocean model. 806.
- Climatic cycles. 867.
- Climatic probability for favorable viewing conditions along path of Mar. 7, 1970, eclipse. 280.
- Climatology of epsilon (atmospheric dissipation). 415.
- Cloudiness:
African disturbances. 716.
African disturbances that developed into Atlantic hurricanes. 256.
Atlantic hurricane season of 1968. 225.
Atlantic tropical disturbances of 1968. 240.
cirrus cloud trail. 616.
convective clouds along jet stream. 873.
cumulus development. 590.
cyclonic systems. 510.
dynamics. 471.
eastern Pacific hurricane season of 1968. 207, 521.
hurricane Camille, Aug. 1969. 828.
inverted V pattern—easterly wave? 130.
moisture content. 471.
rapidly developing eastern U.S. storm. 349.
seeding. 471.
satellite studies in U.S. low-level jet. 490.
sunglint. 155.
tropical Pacific. 163.
variations in equatorial circulation and rainfall. 700.
vertical cloud systems over tropical Atlantic during 1967 hurricane season. 124.
- Comparison of observed and theoretical diurnal tidal motions between 30 and 60 km. 456.
- Conterminous U.S. heavy fog. 116.
- Contents, Volume 97. 916.
- Contribution of infrared cooling to vertical motion field and its implication in atmospheric energetics. 371.
- Convective motions and vertical velocities. 590.
- Correction notices: 76, 123, 332, 636, 715, 918.

Correspondence:

- biennial variation in springtime temperature and total ozone in extratropical latitudes. 613.
 eastern Pacific hurricane season of 1968. 521.
 fields of correlation assembly—numerical analysis technique. 278.
 reliable method for numerical integration of large class of ordinary and partial differential equations. 732.
 reply. 279, 406, 460, 522, 615.
 time extrapolation in jury-marching problem saves computer time. 460.
 weather and circulation of Feb. 1969—cold and dry in East, warm in West. 406.
- COTTEN, G. F.:**
 and J. K. Angell and J. Korshover. Quasi-biennial variations in "centers of action." 867.
- COX, STEPHEN K.:**
 Radiation models of midlatitude synoptic features. 637.
 Cyclones and anticyclones at 700- and 500-mb levels and synoptic chart data for Southern Hemisphere. 193.

D**DANARD, MAURICE B.:**

- Numerical studies of effects of surface friction on large-scale atmospheric motions. 835.
 Simple method of including long-wave radiation in tropospheric numerical prediction model. 77.
 and M. M. Holl and J. R. Clark. Correspondence—Reply (to comments on "Fields of correlation assembly—numerical analysis technique"). 279.

DENNEY, WILLIAM J.:

- Correspondence—Reply (to comments on "Eastern Pacific hurricane season of 1968"). 522.
 Eastern Pacific hurricane season of 1968. 207.

Desert microclimates, Peru. 860.

Development of limited area fine-mesh prediction model. 665.

DEY, CLIFFORD H.:

- Note on global forecasting with Kurihara grid. 597.

DICKSON, ROBERT R.:

- Weather and circulation of Aug. 1969—month with record warmth in West. 830.
 Diurnal variations in upper air pressure. 446.
 Diurnal variations in upper air winds. 446, 456.
 Diurnal wind variations, surface to 30 km. 446.

DJURIĆ, DUŠAN:

- Note on estimation of vertical motion by omega equation. 902.

E

Eastern North American blocking. 116.

Eastern Pacific hurricane season of 1968. 207.

Eclipse of Mar. 7, 1970. 280.

Effect of housing shape on catch of recording gages. 604.

Effect of range on apparent height and frequency of high-altitude radar precipitation echoes. 429.

Effect of sudden change in terrain height on three-dimensional low-level air flow, as estimated from tetroon flights. 845.

ELLSAESSER, HUGH W.:

- Climatology of epsilon (atmospheric dissipation). 415.
 Wind variability as function of time. 424.

ENDLICH, R. M.:

- and R. L. Maneuso. Analyzing and forecasting clear-air turbulence probabilities over U.S. 527.

Equations of motion. 439.

Equatorial Pacific atmospheric teleconnections. 163.

Estimating hurricane wind speeds from satellite pictures. 382.

ESTOQUE, M. A.:

- and C. M. Bhumralkar. Flow over localized heat source. 850.

Evapotranspiration climatology: I. New approach to numerical prediction of monthly evapotranspiration, runoff, and soil moisture storage. 691.

Experimental extended predictions with nine-level hemispheric model. 1.

Experiments with stratospheric general circulation model: III. Large-scale diffusion of ozone including photochemistry. 287.

F**FARKAS, E.:**

Correspondence—Comments on "Biennial variation in springtime temperature and total ozone in extratropical latitudes." 613.

FAWCETT, E. B.:

Systematic errors in operational baroclinic prognoses at National Meteorological Center. 670.

Feasibility of determining atmospheric ozone from outgoing infrared energy. 307.

Finite-difference approximation of primitive equations for hexagonal grid on plane. 439.

Finite-difference schemes for primitive equations for barotropic fluid. 384.

Flow over localized heat source. 850.

Fluid dynamics. 885.

Forecasting (see Prediction).

Forest fires in Alaska, June 1969. 683.

FRANK, NEIL L.:

"Inverted V" cloud pattern—easterly wave? 130.

and H. M. Johnson. Vertical cloud systems over tropical Atlantic during 1967 hurricane season. 124.
 and R. H. Simpson, D. Shideler, and H. M. Johnson. Atlantic tropical disturbances of 1968. 240.

Free air turbulence. 424.

Frictional effects on hurricane winds and motion. 502.

FRITZ, SIGMUND:

Question of measuring vertical temperature distribution of atmosphere from satellites. 712.

Fronts, polar. 432.

Further study on kinetic energy balance. 573.

G**GELMAN, MELVYN E.:**

and K. W. Johnson and A. J. Miller. Proposed indices characterizing stratospheric circulation and temperature fields. 565.
 General circulation of atmospheric thermodynamic processes. 739, 775.

GERRITY, JOSEPH P., JR.:

and R. D. McPherson. Development of a limited area fine-mesh prediction model. 665.

GRAMMELTVEDT, ARNE:

Survey of finite-difference schemes for primitive equations for barotropic fluid. 384.

GRANTHAM, D. D.:

and A. J. Kantor. Effect of range on apparent height and frequency of high-altitude radar precipitation echoes. 429.

GRAY, T. I., JR.:

and A. F. Krueger. Long-term variations in equatorial circulation and rainfall. 700.

Great Lakes ice season of 1968. 315.

GREEN, RAYMOND A.:

Weather and circulation of Dec. 1968—strong blocking over Western Hemisphere and cold in U.S. 281.

Weather and circulation of May 1969—mild month with increase of blocking at high latitudes. 618.

H

Hail suppression projects. 95.

HARTRANFT, F. R.:

and J. M. Wallace. Diurnal wind variations, surface to 30 km. 446.

- Heat balance and mean meridional circulations in polar stratosphere during sudden warming of Jan. 1958. 534.
- Heat balance of atmosphere. 739, 775.
- Heat balance studies during ice-fog period in Fairbanks, Alaska. 512.
- Heavy-fog regions in conterminous U.S. 116.
- HEBERT, PAUL J.:
and A. L. Sugg. Atlantic hurricane season of 1968. 225.
- HEMBREE, G. D.:
and K. Miyakoda, J. Smagorinsky, and R. F. Strickler. Experimental extended predictions with nine-level hemispheric model. 1.
- HOECKER, W. H.:
and J. K. Angell. Effect of sudden change in terrain height on three-dimensional low-level air flow, as estimated from tetroon flights. 845.
- HOLL, MANFRED M.:
and M. B. Danard and J. R. Clark. Correspondence—Reply (to comments on "Fields of correlation assembly—numerical analysis technique"). 279.
- HOLMES, R. M.:
Note on low-level airborne observations of temperature near prairie oases. 333.
- HORN, LYLE H.:
and B. R. Bullock and D. R. Johnson. Contribution of infrared cooling to vertical motion field and its implication in atmospheric energetics. 371.
- HOVERMALE, JOHN B.:
and T. Nitta. Technique of objective analysis and initialization for primitive forecast equations. 652.
- HUBERT, LESTER F.:
Correspondence—Comments on "The eastern Pacific hurricane season of 1968." 521.
- and A. Timchalk. Estimating hurricane wind speeds from satellite pictures. 382.
- HUNT, B. G.:
Experiments with stratospheric general circulation model:
III. Large-scale diffusion of ozone including photochemistry. 287.
- Hurricane dynamics and movement. 502.
- Hurricanes:
African disturbances that developed into Atlantic hurricanes. 256.
Atlantic hurricane season of 1968. 225.
Atlantic tropical disturbances of 1968. 240.
Camille, Aug. 1969. 828.
causes of small number of Atlantic hurricanes in 1968. 346.
eastern Pacific hurricane season of 1968. 207, 521.
estimating hurricane wind speeds from satellite pictures. 382.
quasi-biennial variations in surface pressure. 867.
tropical storms Diana and Fernanda, 1968. 521.
vortical cloud systems over tropical Atlantic during 1967 hurricane season. 124.
- Hydrology of earth's surface and atmospheric circulation. 739.
- I**
- Icebergs viewed from satellites. 405.
- Ice fog in Fairbanks, Alaska. 512.
- Ice season of 1968 on Great Lakes. 315.
- Index, Volume 97. 919.
- Indian monsoon and satellite evidence of sea-air interactions. 905.
- Infrared cooling, vertical motion field, and atmospheric energetics. 371.
- Infrared energy and atmospheric ozone. 307.
- Infrared radiation. 637.
- Infrared radiation from atmosphere and earth. 712.
- Interaction between subtropical and polar-front jet stream. 432.
- Interannual variability of tropospheric energy cycle and quasi-biennial oscillation. 142.
- Instruments for measuring radiation. 637.
- Inverted V cloud pattern—easterly wave? 130.
- J**
- Jet stream. 432.
- Jet stream and convective clouds. 873.
- JOHNSON, DONALD R.:
and B. R. Bullock and L. H. Horn. Contribution of infrared cooling to vertical motion field and its implication in atmospheric energetics. 371.
- JOHNSON, H. M.:
and N. L. Frank. Vortical cloud systems over tropical Atlantic during 1967 hurricane season. 124.
and R. H. Simpson, N. Frank, and D. Shideler. Atlantic tropical disturbances of 1968. 240.
- JOHNSON, KEITH W.:
Preliminary study of stratospheric warming of Dec. 1967—Jan. 1968. 553.
and A. J. Miller and M. E. Gelman. Proposed indices characterizing stratospheric circulation and temperature fields. 565.
- JONES, DOUGLAS M. A.:
Effect of housing shape on catch of recording gages. 604.
- K**
- KANTOR, A. J.:
and D. D. Grantham. Effect of range on apparent height and frequency of high-altitude radar precipitation echoes. 429.
- Kinetic energies, mathematical expressions. 200.
- Kinetic energy balance. 573.
- Kinetic energy dissipation. 415.
- Kinetic energy spectrum near ground. 623.
- Kinetic energy, vertical transfer. 142.
- KORSHOVER, J.:
and J. K. Angell. Correspondence—Reply (to comments on "Biennial variation in springtime temperature and total ozone in extratropical latitudes"). 615.
and J. K. Angell and G. F. Cotten. Quasi-biennial variations in "centers of action." 867.
- KOSS, WALTER JAMES:
Note on accumulated error in numerical integration of simple forecast model. 896.
- KRUEGER, A. F.:
and T. I. Gray, Jr. Long-term variations in equatorial circulation and rainfall. 700.
- KUNG, ERNEST C.:
Further study on kinetic energy balance. 573.
- KUO, H.-L.:
and R. S. Lindzen. Correspondence—Reliable method for numerical integration of large class of ordinary and partial differential equations. 732.
- Kurihara grid and box integration method. 597.
- L**
- LANSING, LIVINGSTON:
Correspondence—Comments on "Weather and circulation of Feb. 1968—cold and dry in East, warm in West." 406.
- Large-scale diffusion of ozone including photochemistry. 287.
- LENTINI, A. D.:
and R. G. Pappas. Picture of month. 462.
- LETTAU, H.:
Evapotranspiration climatology: I. New approach to numerical prediction of monthly evapotranspiration, runoff, and soil moisture storage. 691.
- LINDZEN, R. S.:
and H.-L. Kuo. Correspondence—Reliable method for numerical integration of large class of ordinary and partial differential equations. 732.

LINKLATER, G. D.:
and C. R. Snider. Great Lakes ice season of 1968. 315.
Long-term variations in equatorial circulation and rainfall. 700.
Long-wave radiation effects. 77.

M

- MAHLMAN, J. D.:**
Heat balance and mean meridional circulations in polar stratosphere during sudden warming of Jan. 1958. 534.
- MANABE, SUKURO:**
Climate and ocean circulation: I. Atmospheric circulation and hydrology of earth's surface, II. Atmospheric circulation and effect of heat transfer by ocean currents. 739, 775.
- MANCUSO, R. L.:**
and R. M. Endlich. Analyzing and forecasting clear-air turbulence probabilities over U.S. 527.
- MCCLAIN, E. PAUL:**
and A. E. Strong. Anomalous dark patches in satellite-viewed sunglint areas. 875.
- MCPEHRON, RONALD D.:**
and J. P. Gerrity, Jr. Development of limited area fine-mesh prediction model. 665.
- Mean and eddy motions in atmosphere. 200.
Meridional circulations in polar stratosphere. 534.
Mesospheric structure during warming of stratosphere in Feb. 1966. 541.
- MILLER, ALVIN J.:**
Interannual variability of tropospheric energy cycle and quasi-biennial oscillation. 142.
and K. W. Johnson and M. E. Gelman. Proposed indices characterizing stratospheric circulation and temperature fields. 565.
- MIYAKODA, K.:**
and J. Smagorinsky, R. F. Strickler, and G. D. Hembree. Experimental extended predictions with nine-level hemispheric model. 1.
- Models of precipitating cumulus towers. 471.
- MOREL, PIERRE:**
and R. Sadourny. Finite-difference approximation of primitive equations for hexagonal grid on plane. 439.

N

- NAMIAS, JEROME:**
Causes of small number of Atlantic hurricanes in 968. 1346.
Seasonal interactions between North Pacific Ocean and atmosphere during 1960's. 173.
New England cold front, Feb. 1969. 727.
- NITTA, TAKASHI:**
and J. B. Hovermale. Technique of objective analysis and initialization for primitive forecast equations. 652.
Nocturnal urban boundary layer over Cincinnati, Ohio. 582.
North American nonperiodic rainfall variations. 735.
Northeastern U.S. kinetic energy spectra. 623.
North Pacific Ocean and seasonal interactions with atmosphere during 1960's. 173.
Note on accumulated error in numerical integration of simple forecast model. 896.
Note on drawing probability sectors. 602.
Note on estimation of vertical motion by omega equation. 902.
Note on global forecasting with Kurihara grid. 597.
Note on low-level airborne observations of temperature near prairie oases. 333.
Notice of change in Picture of Month series. 85.
Notice to contributors. 540.
Numerical integration of fluid flow over triangular grids. 885.

- Numerical integration of ordinary and partial differential equations. 732.
Numerical studies of effects of surface friction on large-scale atmospheric motions. 835.

O

- OARD, MICHAEL J.:**
and R. J. Reed and M. Sieminski. Comparison of observed and theoretical diurnal tidal motions between 30 and 60 km. 456.
Ocean-atmosphere interactions over North Pacific and North America during 1960's. 173.
Ocean circulation and climate:
atmospheric circulation and effect of heat transfer by ocean currents. 775.
atmospheric circulation and hydrology of earth's surface. 739.
ocean model. 806.
Ocean currents and atmospheric circulation. 775.
- OORT, ABRAHAM H.:**
and A. Taylor. Kinetic energy spectrum near ground. 623.
- ORVILLE, HAROLD D.:**
and L. J. Sloan. Correspondence—Time extrapolation in combination jury-marching problem saves computer time. 460.

P

- PAPPAS, R. G.:**
and A. D. Lentini. Picture of month. 462.
- PARMENTER, FRANCES C.:**
Picture of month. 86, 155, 349, 510, 616, 683, 730, 828, 873.
- PAULIN, GASTON:**
Simplified method of computing stratospheric heating rates and associated generation of available potential energy. 359.
- PEACE, ROBERT L., JR.:**
Heavy-fog regions in conterminous U.S. 116.
Peruvian desert surface heat budget. 860.
- Picture of month:
Alaskan forest fires. 683.
cirrus cloud trail. 616.
clearing of winter fog in Central Valley, Calif. 205.
convective clouds along jet stream. 873.
early summer tornado situation. 730.
hooked echo associated with snow showers. 462.
hurricane Abby, 1968. 86.
hurricane Camille. 828.
observation of icebergs from satellites. 405.
rapidly developing storm. 349.
sunglint. 155.
upper tropospheric system. 510.
Polar stratosphere, heat balance and mean meridional circulations. 534.
- PORRAS, ALBERTO:**
Picture of month. 405.
- POSEY, JULIAN W.:**
Correspondence—Reply (to comments on "Weather and circulation of Feb. 1968—cold and dry in East, warm in West"). 406.
Weather and circulation of Mar. 1969—very cold month with developing flood threat in upper Midwest. 464.
Weather and circulation of Sept. 1969—persistence of August regime in U.S. 910.
- Potential energy and stratospheric heating rates. 359.
- PRABHAKARA, C.:**
Feasibility of determining atmospheric ozone from outgoing infrared energy. 307.
- Precipitation:
physics. 471.
snow storms. 902.

Prediction:

- balanced forecast models. 150.
- extended forecasting. 1.
- forecasting from upper air information over U.S. 527.
- global forecasting with Kurihara grid. 597.
- hurricanes. 502, 602.
- hydrologic forecasting models. 691, 739.
- ice forecasting. 315.
- nine-level model. 1.
- numerical prediction. 1, 77, 150, 278, 340, 384, 439, 597, 652, 659, 665, 670, 732, 835, 885, 896.
- oceanic model. 806.
- precipitation forecasting. 902.
- severe storm forecasting. 730.
- statistical forecasting. 602, 896.

Preliminary study of stratospheric warming of Dec. 1967-Jan. 1968. 553.

Primitive forecast equations. 653.

Proposed indices characterizing stratospheric circulation and temperature fields. 565.

Proposed mechanism for cumulonimbus persistence in presence of strong vertical shear. 590.

Publications:

- new ESSA publication. 738.
- selected publications by ESSA authors. 141, 277, 571, 909.

Q

Quasi-biennial oscillation and interannual variability of tropospheric energy cycle. 142.

Quasi-biennial variations in centers of action. 867.

Question of measuring vertical temperature distribution of atmosphere from satellites. 712.

QUIROZ, RODERICK S.:

Warming of upper stratosphere in Feb. 1966 and associated structure of mesosphere. 541.

R**Radar:**

- echoes from convective snow showers. 462.
- range-height relations and weather detection. 429.

Radiation models of midlatitude synoptic features. 637.

RAGHAVAN, K.:

Satellite evidence of sea-air interactions during Indian monsoon. 905.

Raingage comparisons. 604.

RAO, GANDIKOTA V.:

Role of differential friction and asymmetry of total flow on hurricane movement. 502.

RAO, M. SANKAR.:

and L. Umscheid, Jr. Tests of effect of grid resolution in global prediction model. 659.

REED, RICHARD J.:

and M. J. Oard and M. Sieminski. Comparison of observed and theoretical diurnal tidal motions between 30 and 60 km. 456.

REITER, ELMAR R.:

Mean and eddy motions in atmosphere. 200.

and L. F. Whitney. Interaction between subtropical and polar-front jet stream. 432.

Remarks on African disturbances and their progress over tropical Atlantic. 716.

Rocketsonde-radiosonde temperatures in stratosphere. 607.

Role of differential friction and asymmetry of total flow on hurricane movement. 502.

S**SADOURNY, ROBERT:**

and P. Morel. Finite-difference approximation of primitive equations for hexagonal grid on plane. 439.

SANDERS, FREDERICK:

Weather note—Mesoscale cold front in New England. 727.

Satellite evidence of sea-air interactions during Indian monsoon. 905.

Satellite photographs:

African disturbances. 716.

African disturbances that developed into Atlantic hurricanes. 256.

Alaskan forest fires, June 1969. 683.

Atlantic hurricane season of 1968. 225.

Atlantic tropical disturbances of 1968. 240.

cirrus cloud trail, May 1969. 616.

clouds, eastern U.S. 432.

clouds, northeast Pacific, June 1968. 510.

clouds, U.S. low-level jet. 490.

convective clouds along jet stream. 873.

daily observations from ESSA 9, Apr. 1969. 523.

daily observations from ESSA 9, May-June 1969. 684.

daily observations from ESSA 9, July-Aug. 1969. 830.

daily observations from ESSA 7, Dec. 1968-Jan. 1969. 351.

daily observations from ESSA 7, Oct. 1968. 88.

dark patches in sunglint areas. 875.

eastern Pacific hurricane season of 1968. 207, 521.

hurricane Abby, 1968. 86.

hurricane Camille, Aug. 1969. 828.

icebergs. 407.

Indian monsoon and sea-air interactions. 905.

inverted V pattern—easterly wave? 130.

North and South Central States, June 1969. 730.

rapidly developing eastern U.S. storm. 349.

sunglint. 155.

tropical storms Diana and Fernanda, 1968. 521.

vortical cloud systems over tropical Atlantic. 124.

winter fog in Central Valley, Calif. 205.

Satellite pictures and estimating hurricane wind speeds. 382.

Satellite studies of clouds and cloud bands near low-level jet. 490.

SCHICKEDANZ, PAUL T.:

and S. A. Changnon, Jr. Utilization of hail-day data in designing and evaluating hail suppression projects. 95.

SCHMIDLIN, FRANCIS J.:

Statistical comparison of winter-summer rocketsonde-radio-sonde temperatures in the 20- to 34-km region of stratosphere. 607.

Sea influence on weather and climate. 775, 806.

Seasonal interactions between North Pacific Ocean and atmosphere during 1960's. 173.

SHIDEKER, DAVID:

and R. H. Simpson, N. Frank, and H. M. Johnson. Atlantic tropical disturbances of 1968. 240.

Shortwave absorption effects. 77.

SIEMINSKI, MARYA:

and R. J. Reed and M. J. Oard. Comparison of observed and theoretical diurnal tidal motions between 30 and 60 km. 456.

Simple method of including long-wave radiation in tropospheric numerical prediction model. 77.

Simplified method of computing stratospheric heating rates and associated generation of available potential energy. 359.

SIMPSON, JOANNE:

and V. Wiggert. Models of precipitating cumulus towers. 471.

- SIMPSON, R. H.:**
and N. Frank, D. Shideler, and H. M. Johnson. Atlantic tropical disturbances of 1968. 240.
- SKAGGS, RICHARD H.:**
Analysis and regionalization of diurnal distribution of tornadoes in U.S. 103.
- SLOAN, LANSING J.:**
and H. D. Orville. Correspondence—Time extrapolation in combination jury-marching problem saves computer time. 460.
- SMAGORINSKY, J.:**
and K. Miyakoda, R. F. Strickler, and G. D. Hembree. Experimental extended predictions with nine-level hemispheric model. 1.
- SNIDER, C. R.:**
and C. D. Linklater. Great Lakes ice season of 1968. 315.
- Southern Hemisphere upper air temperature periodicities. 613.
- Spectrum of horizontal wind speed in northeastern U.S. 623.
- Stability theorems for barotropic vorticity equation. 340.
- STARK, L. P.:**
Weather and circulation of Nov. 1968—continued blocking over eastern North America. 157.
- Weather and circulation of Feb. 1969—strong blocking over North America for sixth consecutive month. 407.
- Statistical comparison of winter-summer rocketsonde-radiosonde temperatures in 20- to 34-km region of stratosphere. 607.
- STEARNS, CHARLES R.:**
Surface heat budget of Pampa de La Joya, Peru. 860.
- Stratospheric circulation index. 565.
- Stratospheric general circulation model. 287.
- Stratospheric heating rates and available potential energy. 359.
- Stratospheric ozone. 613.
- Stratospheric rocketsonde-radiosonde temperatures. 607.
- Stratospheric tracers and large-scale diffusion. 287.
- Stratospheric warming of Dec. 1967-Jan. 1968. 553.
- Stratospheric warming of Feb. 1966. 541.
- STRETN, N. A.:**
Case study of winter circulation at 700 and 500 mb in middle and high southern latitudes. 193.
- STRICKLER, R. F.:**
and K. Miyakoda, J. Smagorinsky, and G. D. Hembree. Experimental extended predictions with nine-level hemispheric model. 1.
- STRONG, ALAN E.:**
and E. P. McClain. Anomalous dark patches in satellite-viewed sunlit areas. 875.
- Strong blocking over North America for sixth consecutive month. 407.
- Strong blocking over Western Hemisphere and cold in U.S. 281.
- SUGG, ARNOLD L.:**
and P. J. Hebert. Atlantic hurricane season of 1968. 225.
- Suggestions for authors. 501.
- SUNDSTRÖM, ARNE:**
Stability theorems for barotropic vorticity equation. 340.
- Truncation error reducing scheme for balanced forecast models. 150.
- Sunglint. 155.
- Sunglint areas and anomalous dark patches. 875.
- Surface friction and its effects on large-scale atmospheric motions. 835.
- Surface heat budget of Pampa de La Joya, Peru. 860.
- Survey of finite-difference schemes for primitive equations for barotropic fluid. 384.
- Synoptic histories of three African disturbances that developed into Atlantic hurricanes. 256.
- Systematic errors in operational baroclinic prognoses at National Meteorological Center. 670.
- TAYLOR, ALBION:**
and A. H. Oort. Kinetic energy spectrum near ground. 623.
- Technique of objective analysis and initialization for primitive forecast equations. 652.
- Temperature and airborne observations near prairie oases. 333.
- Temperature and wind structure of planetary boundary layer over Cincinnati, Ohio. 582.
- Terrain height and low-level air flow. 845.
- Tests of effect of grid resolution in global prediction model. 659.
- Tetra flights across northern California coast. 845.
- Thermal effects on currents and wind. 850.
- THOM, H. C. S.:**
Technical note—Climatic probability for favorable viewing conditions along path of Mar. 7, 1970, eclipse. 280.
- TIMCHALK, ANDREW:**
and L. F. Hubert. Estimating hurricane wind speeds from satellite pictures. 382.
- Time extrapolation in combination jury-marching problem saves computer time. 460.
- Tornadoes:**
early summer situation in North and South Central States. 730.
- U.S. tornadoes. 103.
- Tropical meteorology:**
African disturbances and their progress over tropical Atlantic. 716.
- African disturbances that developed into Atlantic hurricanes. 256.
- Atlantic hurricane season of 1968. 225.
- Atlantic tropical disturbances of 1968. 240.
- causes of small number of Atlantic hurricanes in 1968. 346.
- eastern Pacific hurricane season of 1968. 207, 521.
- equatorial Pacific atmospheric teleconnections. 163.
- estimating hurricane wind speeds from satellite pictures. 382.
- hurricane Camille, Aug. 1969. 828.
- Indian monsoon and sea-air interactions. 905.
- note on drawing probability sectors. 602.
- quasi-biennial variations in surface pressure. 867.
- variations in circulation and rainfall. 700.
- vortical cloud systems over tropical Atlantic during 1967 hurricane season. 124.
- Truncation error reducing scheme for balanced forecast models. 150.
- Turbulence theory. 424.
- U**
- UMSCHEID, LUDWIG, JR.:**
and M. S. Rao. Tests of effect of grid resolution in global prediction model. 659.
- Upper air climatology. 573.
- Upper air pressure variations. 456.
- Upper wind data. 415.
- Upper wind variability. 424.
- Utilization of hail-day data in designing and evaluating hail suppression projects. 95.
- V**
- Vertical diffusion of energy and mass. 573.
- Vertical motion field, infrared cooling, and atmospheric energetics. 371.
- Vertical temperature distribution. 712.
- Vortical cloud systems over tropical Atlantic during 1967 hurricane season. 124.
- Vorticity advection. 902.

W**WAGNER, A. JAMES:**

Weather and circulation of Oct. 1968—progression of large-amplitude features at midlatitudes with rapidly varying temperatures. 88.

Weather and circulation of Jan. 1969—continued strong high-latitude blocking and flood-producing rains in California. 351.

Weather and circulation of June 1969—predominantly cold and wet month. 684.

WALLACE, J. M.:

and F. R. Hartranft. Diurnal wind variations, surface to 30 km. 446.

Warming of upper stratosphere in Feb. 1966 and associated structure of mesosphere. 541.

Water balance of basins. 691.

Weather radar. 429.

Weather, U.S.:

Great Lakes ice season of 1968. 315.

hail. 95.

heavy-fog regions in conterminous U.S. 116.

ice-fog period in Fairbanks, Alaska. 512.

mesoscale cold front in New England. 727.

Index**Weather, U.S. (Continued):**

monthly résumés Oct. 1968–Sept. 1969. 88, 157, 281, 351, 407, 464, 523, 618, 684, 735, 830, 910.

severe flooding in upper Midwest, Apr. 1969. 523.

tornadoes. 103.

winter fog in Central Valley, Calif. 205.

WENDLER, GERD:

Heat balance studies during an ice-fog period in Fairbanks, Alaska. 512.

WHITNEY, L. F.:

and E. R. Reiter. Interaction between subtropical and polar-front jet stream. 432.

WIGGERT, VICTOR:

and J. Simpson. Models of precipitating cumulus towers. 471.

WILLIAMSON, DAVID:

Numerical integration of fluid flow over triangular grids. 885.

Wind variability as function of time. 424.

WINNINGHOFF, FRANK:

and W. D. Bonner. Satellite studies of clouds and cloud bands near low-level jet. 490.

Winter circulation at 700 and 500 mb in middle and high southern latitudes. 193.